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(54) Captioning apparatus for VCR

(57) A caption display apparatus for a video cassette recorder (VCR), comprising a caption signal detection circuit 20 for detecting a caption signal from a video signal, a caption display signal generation circuit 30 for generating a caption character signal in response to the detected caption signal from the caption signal detection circuit and then outputting a caption display signal as a result of determination of a display size and a display window position of the generated caption character signal, a caption control device 100 for storing the caption display signals from the caption display signal generation circuit and selectively outputting the stored caption display signals in a normal play mode or one of modes other than the normal play mode under selection of the user to perform the caption display for a predetermined time period in the mode selected by the user, and a video/character signal combination circuit 50 for combining the selected caption display signals from the caption control device with the video signal and outputting the combined signals to a monitor 60 so that the caption display is performed on a video picture on a screen of the monitor. Use of a caption memory in caption control device 100 allows captioning in reproduction mode other than at normal speed.

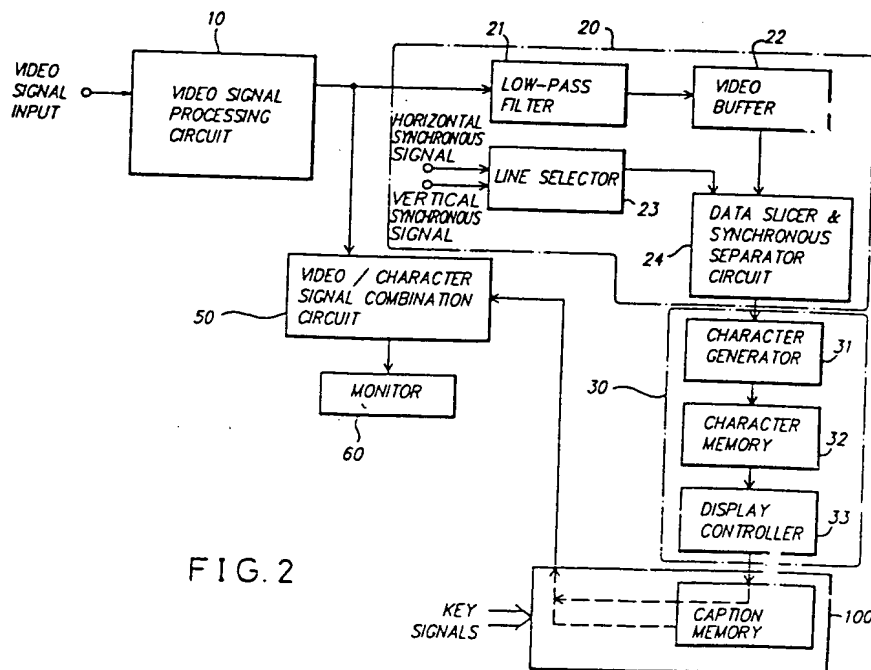


FIG. 2

GB 2 259 219 A

FIG. 1
PRIOR ART

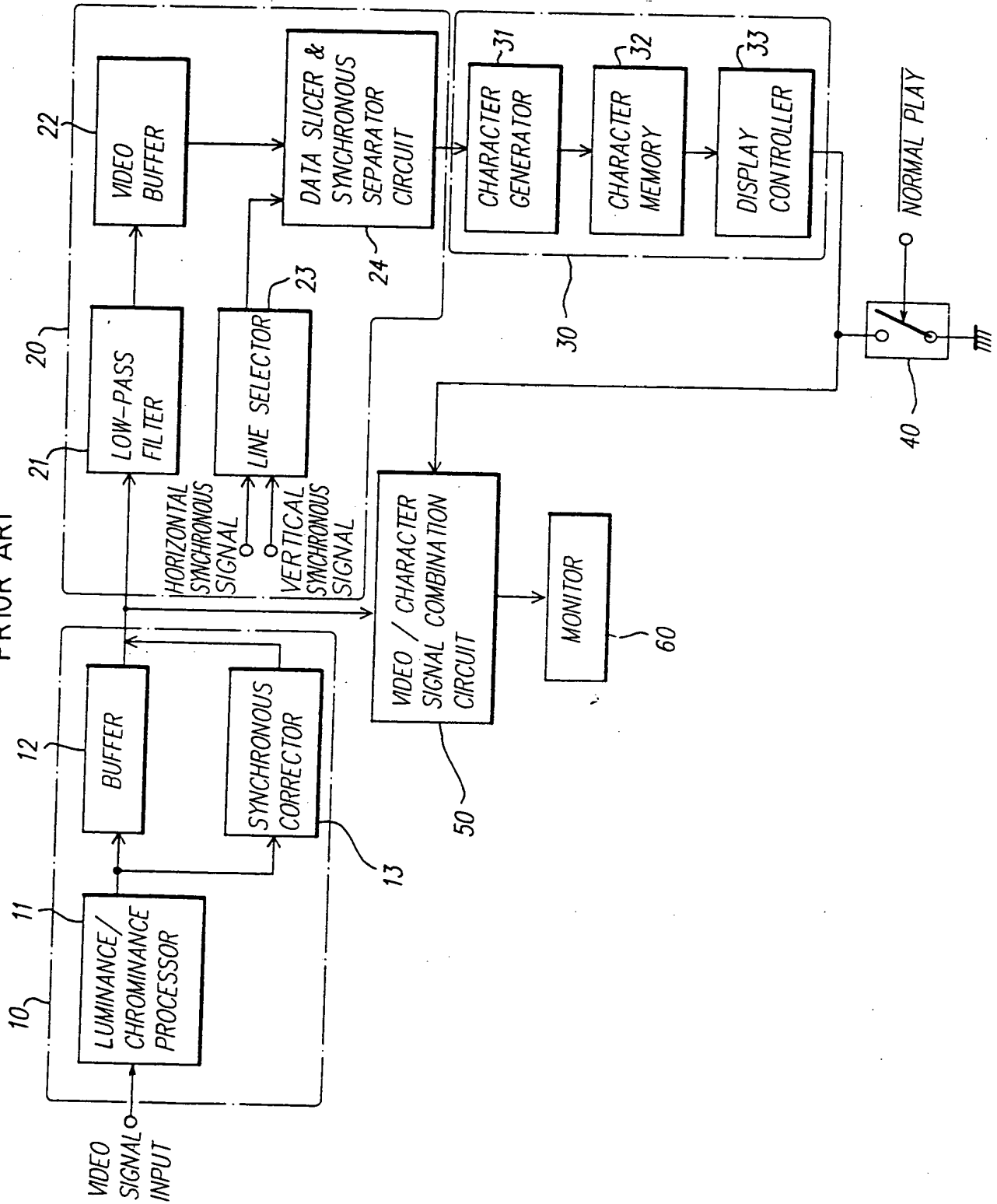


FIG. 2

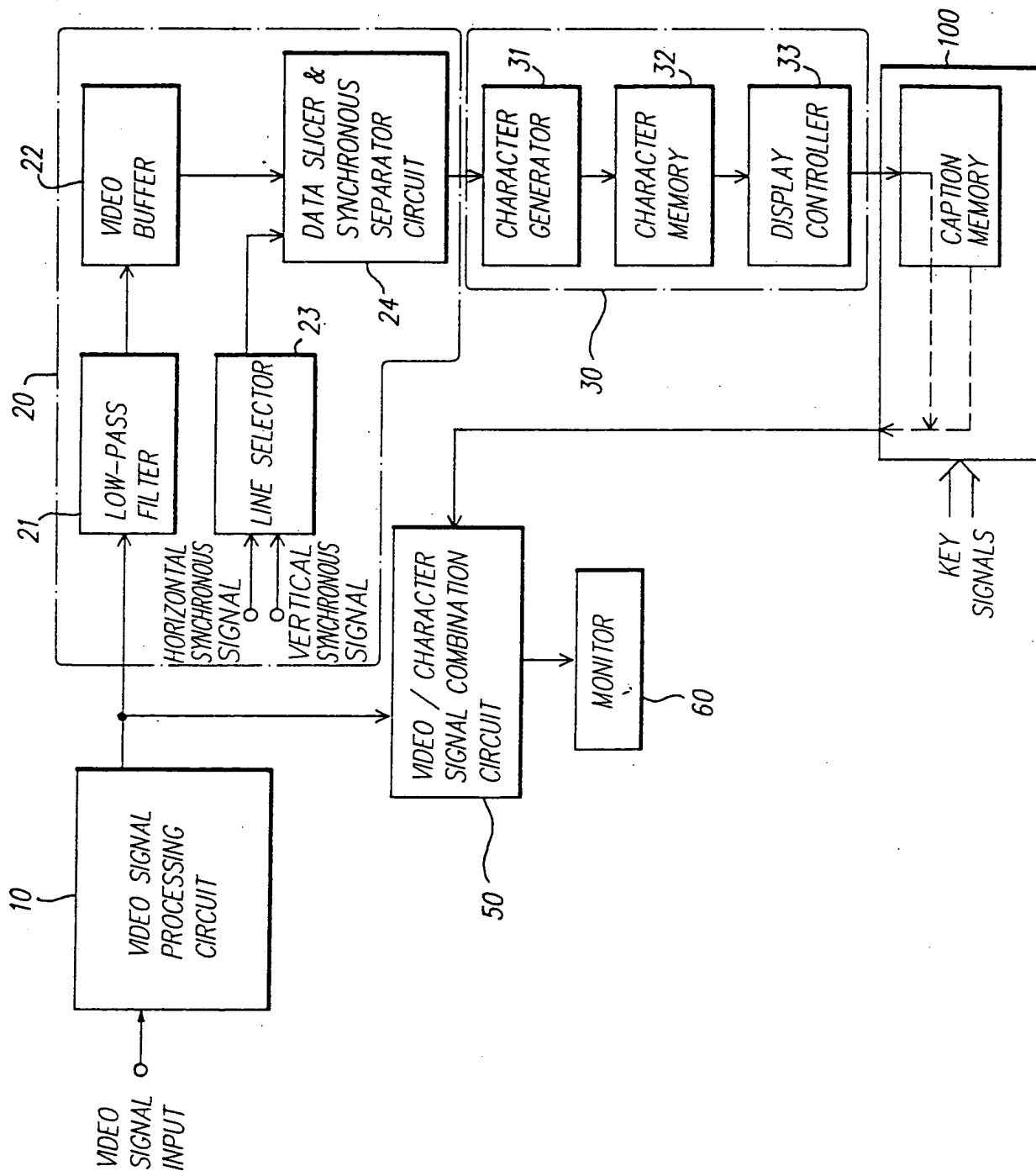


FIG. 3

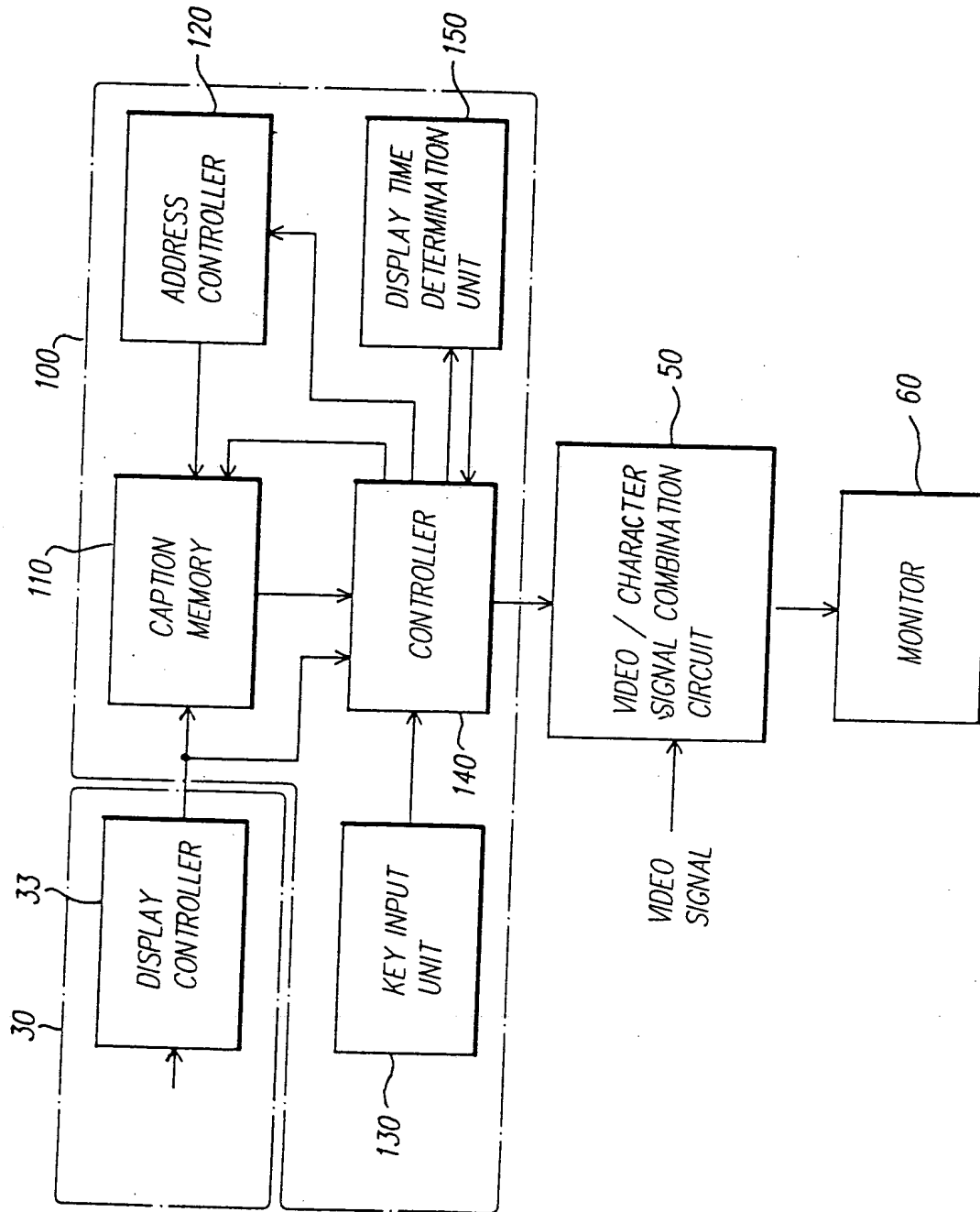
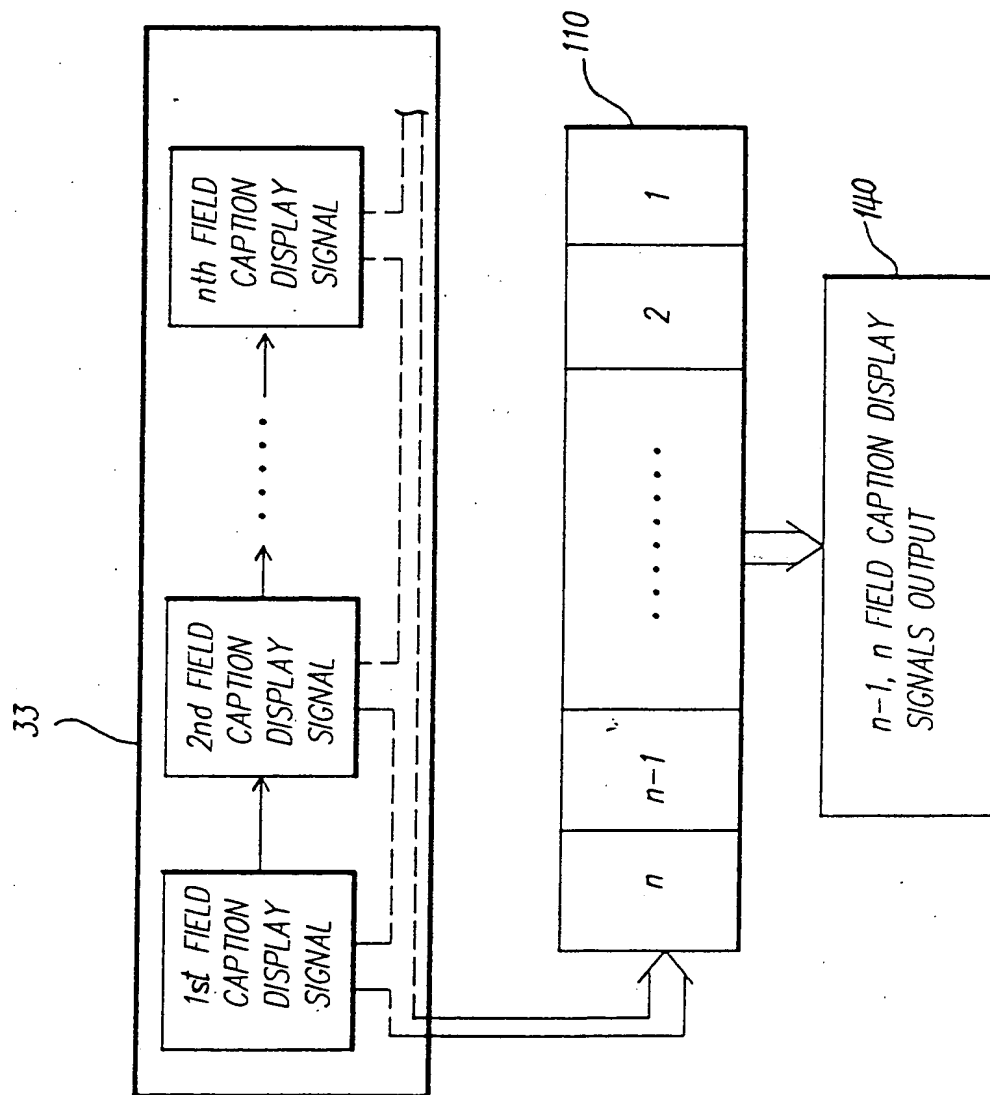


FIG. 4



CAPTION DISPLAY APPARATUS FOR VCR

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The present invention relates in general to a caption display of a video cassette recorder, referred to hereinafter as VCR, and more particularly to a caption display apparatus for a VCR, which is capable of storing caption display signals in a memory and outputting the stored caption display signals to a screen to display them in any of operating modes of the VCR under selection of the user.

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Description of the Prior Art

Referring to Fig. 1, there is shown a block diagram of a conventional caption display apparatus for a VCR. As shown in this drawing, the conventional caption display apparatus for the VCR comprises a video signal processing circuit 10 for receiving a video signal, processing luminance and chrominance signals of the inputted video signal and correcting vertical and horizontal synchronous signals of the inputted video signal, a caption signal detection circuit 20 for detecting a caption signal from the processed video signal from the video signal processing circuit 10, a caption display signal generation circuit 30 for generating a caption character signal in response to the detected caption signal from the

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caption signal detection circuit 20 and then outputting a caption display signal as a result of determination of a display size and a display window position of the generated caption character signal, a caption display control switch 40
5 for transferring the caption display signal from the caption display signal generation circuit 30 in only a normal play mode, and a video/character signal combination circuit 50 for combining the caption display signal transferred in only the normal play mode by the caption display control switch with
10 the processed video signal from the video signal processing circuit 10 and outputting the combined signals to a monitor 60 so that the caption display is performed on a video picture on a screen of the monitor 60.

The video signal processing circuit 10 includes a
15 luminance/chrominance processor 11, a buffer 12 and a synchronous corrector 13 and the caption signal detection circuit 20 includes a low pass filter 21, a video buffer 22, a line selector 23 and a data slicer and synchronous separator circuit 24. Also, the caption display signal generation
20 circuit 30 includes a character generator 31, a character memory 32 and a display controller 33.

The operation of the conventional VCR caption display apparatus with the above-mentioned construction will now be described.

25 In operation, upon receiving the video signal on which

the caption signal is carried, the video signal processing circuit 10 processes the luminance and chrominance signals of the inputted video signal and corrects the vertical and horizontal synchronous signals of the inputted video signal.

5 In other words, in the video signal processing circuit 10, the luminance and chrominance signals of the inputted video signal are processed by the luminance/chrominance processor 11 and the vertical and horizontal synchronous signals of the inputted video signal are corrected by the synchronous
10 corrector 13. Also, in the buffer 12, a noise of the inputted video signal is removed. The processed video signal from the video signal processing circuit 10 is applied to the caption signal detection circuit 20 and the video/character signal combination circuit 50. It is noted herein that the caption
15 signal is carried in a predetermined interval (equalizing pulse interval) of a vertical blanking interval of the processed video signal from the video signal processing circuit 10.

In the caption signal detection circuit 20, the processed
20 video signal from the video signal processing circuit 10 is low pass-filtered by the low pass filter 21 and then buffered by the video buffer 22, which applies the buffered video signal to the data slicer and synchronous separator circuit 24. Also, the line selector 23 generates a line select signal
25 for designation of the interval of the video signal in which

the caption signal is carried. The generated line select signal from the line selector 23 is also applied to the data slicer and synchronous separator circuit 24.

5 Then in the data slicer and synchronous separator circuit 24, from the video signal is sliced the caption signal which is carried in the predetermined interval (equalizing pulse interval) of the vertical blanking interval of the video signal, and the vertical and horizontal synchronous signals are separated from the video signal. As a result, the
10 resulting caption signal is detected from the video signal in the data slicer and synchronous separator circuit 24.

Upon detection of the caption signal, the caption display signal generation circuit 30 generates the caption character signal in response to the detected caption signal and then
15 outputs the caption display signal as a result of determination of the display size and the display window position of the generated caption character signal. Namely, in the caption display signal generation circuit 30, the character generator 31 addresses the character memory 32
20 according to the detected caption signal. As a result, the caption character signal is generated from the addressed location of the character memory 32. Then, the size and the window position when the generated caption character signal is displayed are determined under the control of the display
25 controller 33. As a result of determination of the display

size and the display window position of the generated caption character signal, the caption display signal is outputted from the display controller 33.

5 The caption display signal from the display controller 33 is transferred to the video/character signal combination circuit 50 in only the normal play mode by the caption display control switch 40. The caption display control switch 40 is turned off in only the normal play mode under control of a controller (not shown), in order to transfer the caption display signal from the display controller 33 to the video/character signal combination circuit 50 in only the normal play mode. On the other hand, the caption display control switch 40 is turned on in modes (for example, Slow, Still, Cue, REV. and etc.) other than the normal play mode under the control of the controller, so that the caption display signal from the display controller 33 is bypassed to the ground. As a result, in this case, the caption display signal from the display controller 33 is not transferred but blocked to the video/character signal combination circuit 50.

20 In the normal play mode, the caption display signal from the display controller 33 is combined in the video/character signal combination circuit 50 with the processed video signal from the video signal processing circuit 10. The combined signals from the video/character signal combination circuit 50 are outputted to the monitor 60. For this reason, the caption

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display is performed on the video picture on the screen of the monitor 60 in only the normal play mode.

However, the conventional VCR caption display apparatus has a disadvantage, in that the caption display is not performed in the modes other than the normal play mode such as, for example, Slow, Still, Cue, REV. and etc., since it is adapted to be performed in only the normal mode.

Therefore, it is an object of the present invention to provide a caption display apparatus for a VCR, which is capable of performing caption display in any of operating modes of the VCR as well as a normal play mode under selection of the user.

It is another object of the present invention to provide a caption display apparatus for a VCR, which is capable of storing caption display signals in a memory and outputting selected ones of the stored caption display signals under selection of the user to perform the caption display for a predetermined period of time.

In accordance with the present invention, the above objects can be accomplished by a provision of a caption display apparatus for a VCR, comprising: a caption signal detection unit for detecting a caption signal from a video

signal from a video signal processing unit which processes
luminance and chrominance signals of the video signal; a
caption display signal generation unit for generating a
caption character signal in response to the detected caption
5 signal from the caption signal detection unit and then
outputting a caption display signal as a result of
determination of a display size and a display window position
of the generated caption character signal; a caption control
unit for storing the caption display signals from the caption
10 display signal generation unit and selectively outputting the
stored caption display signals in a normal play mode or one of
modes other than the normal play mode under selection of the
user to perform the caption display for a predetermined time
period in the mode selected by the user; and a video/character
15 signal combination unit for combining the selected caption
display signals from the caption control unit with the video
signal from the video signal processing unit and outputting
the combined signals to a monitor so that the caption display
is performed on a video picture on a screen of the monitor.

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The above and other objects, features and advantages of
the present invention will be more clearly understood from the
25 following detailed description taken in conjunction with the

accompanying drawings, in which:

Fig. 1 is a block diagram of a conventional caption display apparatus for a VCR;

Fig. 2 is a block diagram of a caption display apparatus for a VCR in accordance with the present invention;

Fig. 3 is a detailed block diagram of a caption control device in the apparatus of Fig. 2; and

Fig. 4 is a view illustrating a manner of storing caption display signals in a caption memory in the caption control device of Fig. 3 in accordance with the present invention.

Referring to Fig. 2, there is shown a block diagram of a caption display apparatus for a VCR in accordance with the present invention. As shown in this figure, the VCR caption display apparatus of the present invention comprises a caption signal detection circuit 20 for detecting a caption signal from a video signal from a video signal processing circuit, a caption display signal generation circuit 30 for generating a caption character signal in response to the detected caption signal from the caption signal detection circuit 20 and then outputting a caption display signal as a result of determination of a display size and a display window position of the generated caption character signal, a caption control

device 100 for storing the caption display signals from the caption display signal generation circuit 30 and selectively outputting the stored caption display signals in a normal play mode or one of modes other than the normal play mode under selection of the user to perform the caption display for a predetermined time period in the mode selected by the user, and a video/character signal combination circuit 50 for combining the selected caption display signals from the caption control device 100 with the video signal from the video signal processing circuit 10 and outputting the combined signals to a monitor 60 so that the caption display is performed on a video picture on a screen of the monitor 60.

Herein, the construction and operation of the video signal processing circuit 10 are the same as those in Fig. 1 and a description thereof will thus be omitted. Also, similarly to those in Fig. 1, the caption signal detection circuit 20 includes a low pass filter 21, a video buffer 22, a line selector 23 and a data slicer and synchronous separator circuit 24 and the caption display signal generation circuit 30 includes a character generator 31, a character memory 32 and a display controller 33.

Referring to Fig. 3, there is shown a detailed block diagram of the caption control device 100 in the apparatus of Fig. 2. As shown in the drawing, the caption control device 100 includes a caption memory 110 for storing the caption

display signals from the caption display signal generation circuit 30, a key input unit 130 for inputting key signals for caption display control of the user, an address controller 120 for controlling read/write addresses from/into the caption memory 110, a display time determination unit 150 for determining the time period during which the caption display is performed, and a controller 140 for controlling the address controller 120 and the display time determination unit 150 in response to the caption display control key signals through the key input unit 130 to selectively output the caption display signals stored in the caption memory 110 to the video/character signal combination circuit 50 for the predetermined period of time in the mode selected by the user.

The operation of the VCR caption display apparatus with the above-mentioned construction in accordance with the present invention will hereinafter be described in detail.

In operation, when a video tape on which the caption signal is recorded is played back or when an external video signal or a broadcasting signal on which the caption signal is carried is inputted for display on the monitor, the video signal from the video signal processing circuit 10 is applied to the caption signal detection circuit 20 and the video/character signal combination circuit 50.

In the caption signal detection circuit 20, the video signal from the video signal processing circuit 10 is low

pass-filtered by the low pass filter 21 and then buffered by the video buffer 22, which applies the buffered video signal to the data slicer and synchronous separator circuit 24. Also, the line selector 23 generates a line select signal for designation of a predetermined interval (equalizing pulse interval) of a vertical blanking interval of the video signal in which the caption signal is carried. The generated line select signal from the line selector 23 is also applied to the data slicer and synchronous separator circuit 24.

Then in the data slicer and synchronous separator circuit 24, from the video signal is sliced the caption signal which is carried on the video signal, and the vertical and horizontal synchronous signals are separated from the video signal. As a result, the resulting caption signal is detected from the video signal in the data slicer and synchronous separator circuit 24.

Upon detection of the caption data signal, the caption display signal generation circuit 30 generates the caption character signal in response to the detected caption signal and then outputs the caption display signal as a result of determination of the display size and the display window position of the generated caption character signal. Namely, in the caption display signal generation circuit 30, the character generator 31 addresses the character memory 32 according to the detected caption signal. As a result, the

caption character signal is generated from the addressed location of the character memory 32. Then, the size and the window position when the generated caption character signal is displayed are determined under the control of the display controller 33. As a result of determination of the display size and the display window position of the generated caption character signal, the caption display signal is outputted from the display controller 33.

The caption display signals from the display controller 33 in the caption display signal generation circuit 30 are applied to the caption control device 100. In the caption control device 100, the caption display signals from the display controller 33 are first stored in the caption memory 110 and then outputted directly to the video/character signal combination circuit 50 in the normal play mode under the control of the controller 140. As a result, the caption display is performed on the video picture on the screen of the monitor 60.

On the other hand, in the modes other than the normal play mode such as, for example, Slow, Still, Cue, REV. and etc., the controller 140 reads the caption display signals stored in the caption memory 110 and outputs the read caption display signals to the video/character signal combination circuit 50 for the predetermined time period.

Referring to Fig. 4, there is shown a view illustrating

a manner of storing the caption display signals in the caption memory 110 in the caption control device 100 of Fig. 3 in accordance with the present invention. The caption display signals are stored in the unit of field in the caption memory 110 under the control of the controller 140. Namely, the caption display signals which are inputted in sequence in the unit of field are stored in the caption memory 110, being shifted in the input order in the unit of field. In a case where the caption display signal newly inputted is stored at the start address of the caption memory 110 under the condition that the storage capacity of the caption memory 110 is entirely filled with the caption display signals previously inputted, the caption display signal stored at the last address of the caption memory 110 is reset. In other words, the caption display signal stored first in the caption memory 110 is reset.

In a case of outputting the caption display signals stored in the caption memory 110 in the modes other than the normal play mode such as, for example, Slow, Still, Cue, REV. and etc., the caption display signals stored at the last two addresses n and $n-1$ are outputted under the control of the controller 140. Namely, the caption display signals of the last two addresses or two fields n and $n-1$ are outputted synchronously with the video signal.

Also in a case where the user while watching the caption

display signal being presently displayed would like to display the previously stored caption display signals, this case can be accomplished by successively pushing a caption select key or an output address control key (not shown) on the key input unit 130 to control the output addresses of the caption memory 110. As a result, the caption display signals are in sequence outputted for display on the screen from the specified addresses to the last two addresses n and $n-1$.

For example, when the user would like to take the caption display in the slow mode, he or she selects the slow mode as the caption display mode through the key input unit 130. As a result, the controller 140 determines the slow mode as the caption display mode. The controller 140 checks whether the operating mode of the VCR is the slow mode. Upon checking that the operating mode of the VCR is the slow mode, the controller 140 controls the caption memory 110 in the read mode and addresses it. In result, the caption display signals from the addressed locations of the caption memory 110 are outputted to the video/character signal combination circuit 50.

At this time, normally, the display time determination unit 150 controls such that the time period during which the caption display signal is outputted is in accord with the display time period in the normal play mode. If the user presets the caption display time period through the key input

unit 130, the display time determination unit 150 memorizes the preset caption display time period and then the caption display signal is outputted for the preset caption display time period under the control of the display time determination unit 150.

As hereinbefore described, according to the present invention, there is provided the caption display apparatus for the VCR, which is capable of performing the caption display in any of the operating modes of the VCR such as Slow, Still, Cue, REV. and etc. as well as the normal play mode under selection of the user. Also, the caption display can be performed on the specified video picture for the predetermined time period. Further, selected ones of the stored caption display signals can be displayed under selection of the user. Therefore, the present invention is very advantageous, particularly when it is applied to language study fields.

Although the preferred embodiments of the present invention have been disclosed for illustrative purpose, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

CLAIMS:

1. A caption display apparatus for a VCR, comprising:

caption signal detection means for detecting a caption
5 signal from a video signal from video signal processing means
which processes luminance and chrominance signals of the video
signal;

caption display signal generation means for generating a
caption character signal in response to the detected caption
10 signal from said caption signal detection means and then
outputting a caption display signal as a result of
determination of a display size and a display window position
of the generated caption character signal;

caption control means for storing the caption display
15 signals from said caption display signal generation means and
selectively outputting the stored caption display signals in
a normal play mode or one of modes other than the normal play
mode under selection of the user to perform the caption
display for a predetermined time period in the mode selected
20 by the user; and

video/character signal combination means for combining
the selected caption display signals from said caption control
means with the video signal from said video signal processing
means and outputting the combined signals to a monitor so that
25 the caption display is performed on a video picture on a

screen of the monitor.

2. A caption display apparatus for a VCR, as set forth in Claim 1, wherein said caption control means includes:

5 a caption memory for storing the caption display signals from said caption display signal generation means;

a key input unit for inputting key signals for caption display control of the user;

10 an address controller for controlling read/write addresses from/into said caption memory;

a display time determination unit for determining the time period during which the caption display is performed; and

15 a controller for controlling said address controller and said display time determination unit in response to the caption display control key signals through said key input unit to selectively output the caption display signals stored in said caption memory to said video/character signal combination means for the predetermined period of time in the mode selected by the user.

20 3. A caption display apparatus for a VCR substantially as hereinbefore described and as shown in any of Figures 2 to 4 of the accompanying drawings.

* CORRECTED

Relevant Technical Fields

(i) UK Cl (Ed.) H4F FBB FDC FGG FGH FGJ FGS FGT

(ii) Int Cl (Ed.) H04N 5/92 9/82

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE: WPI

Search Examiner
M K REESDate of completion of Search
6 NOVEMBER 1992Documents considered relevant
following a search in respect of
Claims :-
1-3

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- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2170371 A (MITSUMI ELECTRIC CO) See whole document	1
A	EP 0241683 A2 (GRUNDIG EMV) See whole document	1
X,P	WO 92/00647 A1 (WNM VENTURES INC) (09.01.1992) See Figure 7; page 17, line 22 to page 19, line 4	1

Category	Identity of document and relevant passages	Relevance to claim(s)

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